

Evaluation of sharp injuries in healthcare professionals

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ABSTRACT

Aims: We carried out this descriptive study to retrospectively explore the occupational accidents in our hospital between January 01, 2016 - December 31, 2019.

Methods: We present the descriptive statistics as means, standard deviations, frequencies, and percentages.

Results: While 49.3% of the participants were aged 18-29 years, 75.2% were females. About half of the participants (52.2%) held a secondary school diploma. While 31.3% worked as trainee nurses, 24.4% were employed as nurses. Similarly, approximately half of the participants (48.9%) were deployed in clinics, and 16.0% engaged in care in intensive care units. Given the way the participants experienced the occupational accident, 53.3% were injured with a needle-stick (syringe/branule) and 21.9% with a lancet.

Conclusion: It is well-known that sharp object injuries constitute a significant portion of occupational accidents occurring to healthcare professionals. Accordingly, the measures to be adopted to prevent such undesirable situations may be led by uncovering the frequency of and underlying factors for sharp object injuries, causing worries among healthcare professionals and loss of workforce and even death.

Keywords: Occupational health, accidents, sharp object injuries, occupational injuries

INTRODUCTION

The International Labor Organization (ILO) defines an occupational accident as a situation leading to injury and damage resulting from an unplanned and unexpected event.¹ In the Occupational Health and Safety Law No. 6331 published in the Official Gazette No. 28339 dated June 30, 2012, it is defined as an event occurring in the workplace or due to the conduct of the work, causing death or making bodily integrity mentally or physically disabled.²

Working with an adorable devotion both in the world and in our country, healthcare professionals frequently encounter a number of dangers during working hours and, as a result, suffer from occupational accidents. The most common one may be considered an occupational accident resulting from injuries by sharp and penetrating objects such as needles, branules, suture needles, scalpels, intravenous catheters, and lancets.³ Due to such and similar dangers while offering healthcare services, hospitals are included in the list of "very hazardous" class workplaces, according to the Workplace Hazard Classes Communiqué on Occupational Health and Safety published in the Official Gazette No. 28602 dated March 29, 2013.⁴

Biological factors (e.g., Hepatitis B, Hepatitis C, and HIV) that may be transmitted due to sharp object injuries are considered major health problems for healthcare professionals.^{5,6} Of the two million injuries among healthcare professionals each year, it is estimated that 66,000 cause HBV, 16,000 lead to HCV, and about 1,000 cause HIV. The risk of infection following a needle-stick injury with a contaminated needle is calculated to be 0.3% for HIV, 2-40% for HBV, and 2.7-10% for HCV.⁷ According to the Centers for Disease Control and Prevention (CDC) data, the number of needle-stick injuries among healthcare professionals is increasing every year, implying that 385 thousand needle injuries and an average of 1,000 sharp object injuries entrap hospital workers per day.⁸ It was previously reported that 16,000 healthcare professionals experience injuries with an HIV-contaminated needle-stick in a year in the USA and that 5,000 are exposed to Hepatitis B, Hepatitis C, and HIV agents each year due to workplace injuries.³ In the USA, about 250 healthcare professionals lose their lives each year due to HBV infection and related complications.⁸ The most common cause of occupational accidents among healthcare professionals was reported to be percutaneous injuries in the literature in Turkey. In addition, they were said to occur mostly among nurses and in hands.⁹⁻¹¹

It is well-known that sharp object injuries constitute a significant portion of occupational accidents occurring to healthcare professionals. Accordingly, the measures to be adopted to prevent such undesirable situations may be led by uncovering the frequency of and underlying factors for sharp object injuries, causing worries among healthcare professionals and loss of workforce and even death. Hence, there is a need for research to reveal the risk factors for occupational accidents among healthcare professionals.

In the present study, we attempted to explore the reasons for occupational accidents and underlying factors among healthcare professionals having had an occupational accident in a tertiary health institution.

METHODS

The target population of this retrospective descriptive study consisted of all occupational accidents reported to the Employee Health Unit (EHU) of Ankara Atatürk Chest Diseases and Thoracic Surgery Training and Research Hospital between January 01, 2016 - December 31, 2019. Then, we recruited the files of 137 healthcare professionals had an occupational accident. Among the occupational accidents, we used the data of the health workers surveyed for sharp object injuries. The data were extracted from the occupational accident notification and evaluation forms, which must be filled out by the EHU following any notification of an occupational accident.

The Ethics Committee of Keçiören Training and Research Hospital granted ethical approval to our study (Date: 02.23.2021, Decision No: 2012-KAEK-15/2219). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

The data were analyzed using the SPSS 15.0 program, and descriptive statistics are presented as means, standard deviations, frequencies, and percentages.

RESULTS

About half of the participants (49.3%) were aged 18-29 years, while 19.8% were aged 30-39 years ($M = 31.5 \pm 11.4$). The majority of them (75.2%) were females, and 52.2% held a secondary school diploma. While 31.3% worked as trainee nurses, 24.4% were employed as nurses. Similarly, approximately half of the participants (48.9%) were deployed in clinics, 16.0% engaged in care in intensive care units (ICU), and 14.6% were staffed in operating rooms (Table 1).

The vast majority of the participants (93.4%) had an occupational accident due to sharp object injuries. About 43.0% were injured by a needle-stick and 24.7% by a lancet. Finally, 93.2% of the participants reported being injured in their hands (Table 2).

More than half of the participants (58.4%) reported that the injury-leading instrument was contaminated with the patient's blood and body fluids, and we found that 34.0% of the patients had a blood-borne disease. Of these diseases, 68.7% were HBV, and 31.3% were HCV. In the event of the injuries reported, 88.8% of the participants reported utilizing personal protective equipment (PPE). While the majority (97.4%) used gloves, 8.8% wore masks (Table 3).

Table 1. Participants' descriptive characteristics (Ankara, 2020)

	n	(%)*
Age groups (n=126)		
18-29 years	62	49.3
30-39 years	25	19.8
40-49 years	29	23.0
50 years and older	10	7.9
Sex (n=137)		
Female	103	75.2
Male	34	24.8
Educational attainment (n=92)		
Primary school	6	6.5
Secondary school	48	52.2
Vocational school	11	12.0
Undergraduate degree	27	29.3
Title (n=131)		
Trainee nurse	41	31.3
Nurse	32	24.4
Hospital janitor	21	16.0
Physician	14	10.7
Other**	23	17.6
Unit deployed (n=137)		
Clinic	67	48.9
ICU	22	16.0
Operation room	20	14.6
Emergency department	7	5.1
Other***	21	15.3
*Column percentage		
**The most frequent responses in this group were 'Anesthesia Technician,' 'Medical Waste Worker,' and 'Disinfection Staff.'		
***The most frequent responses in this group were 'Blood Collection Unit' and 'Medical Waste Unit.'		

Table 2. Some characteristics of participants' occupational accidents (Ankara, 2020)

	n	(%)*
Form of occurrence of accident (n=137)		
Needle-stick (needle/branule)	73	53.3
Lancet	30	21.9
Suture needle	7	5.1
Other**	27	19.7
Scope of occupation accident (n=137)		
Sharp object injury	128	93.4
Contamination with blood and body fluids	4	2.9
Fall/stroke/injury	3	2.2
Other***	2	1.4
Instrument causing occupation accident (n=121)		
Needle	52	43.0
Lancet	30	24.7
Branule	16	13.3
Suture needle	7	5.7
Other****	16	13.3
Injured Area (n=118)		
Hands	110	93.2
Eyes	4	3.4
Other*****	4	3.4
*Column percentage		
**The most frequent responses in this group were 'Injury with Scalpel' and 'Splash of Blood and Body Fluids.'		
***The most frequent responses in this group were 'Exposure to Chemicals' and 'Slip.'		
****The most frequent responses in this group were 'Insulin Pen Needle' and 'Frozen Section Knife.'		
*****The most frequent responses in this group were 'Frozen Section Knife' Legs' and 'Head.'		

Table 3. Participants' injury-related characteristics(Ankara, 2020)

	n	(%) [*]
Injury-leading instruments' contamination with the patient's blood and body fluids (n=137)		
Contaminated	80	58.4
Not contaminated	57	41.6
Patient's blood-borne disease status(n=47)		
Yes	16	34.0
No	31	66.0
Blood-borne diseases (n=16)		
HBV	11	68.7
HCV	5	31.3
Participants' use of PPE at injury (n=89)		
Yes	79	88.8
No	10	11.2
PPE used (n=79) [*]		
Gloves	77	97.4
Mask	7	8.8
Goggles	4	5.1
Protective apron	3	3.7

^{*}Column percentage

[±]: More than one response was given to the question. The percentage was calculated considering the number of respondents.

DISCUSSION

About half of our participants having suffered occupational accidents were younger than 30 years and secondary school graduates. Similarly, nearly half of them (55.7%) worked as nurses. Overlapping with the findings in the relevant literature, it can be asserted that the incidence of occupational accidents becomes more common among nurses, who are in frequent contact with patients, and younger age groups with inadequate experience.

The most common cause of occupational accidents in healthcare institutions in the world and Turkey is sharp object injuries, among which needle-stick injuries are prominent. In a Kuwait-based study, 75.9% of the participants reported having a needle-stick injury.¹² Another study in Australia showed that 56% of sharp object injuries were classified as needle-stick injuries.¹³ In a study in Isparta, 50.9% of the participants reported having had a needle-stick injury.¹⁴

Özdemir et al. explored sharp object injuries among intern physicians and internal medicine and surgery residents of a medical faculty. They found that 78.1% of the residents and 48.8% of the interns stated having had a sharp object injury during their education or professional life and that the most common type of such an injury was needle-stick injury.¹⁵ In another study, it was stated that 86.8% of occupational accidents by healthcare professionals were due to sharp object injuries.¹⁶ Similar to the literature, 93.4% of our participants had an occupational accident due to a sharp object injury, and more than half of them stated having experienced a needle-stick injury. These findings may be due to the adoption of injection treatments in hospitals quite frequently and the increased fatigue, insomnia, and related careless behaviors among healthcare professionals as a result of the intense working pace while providing such services. The lack of training of inexperienced staff may also be a prominent reason for such accidents.

In this study, 93.2% of our participants had a sharp object injury in their hands. In a study in Isparta, the authors found the primary injury site of 60.4% of those

having had a sharp object injury was hands-finger.¹⁴ In our study, the vast majority of the participants were injured by a sharp object. Such injuries to hands may be due to various reasons, such as nurses' ignoring to close the needle cap during or after the injection, janitors' carelessness while emptying the waste boxes, and physicians' pricking the suture needle into their hands mistakenly while suturing.

The findings showed that 16 participants with an occupational accident due to a sharp object injury contacted the body fluids of patients with hepatitis infection. Among them, 68.7% were diagnosed with Hepatitis B, and 31.3% with Hepatitis C.

It is known that the risk of transmission in the case of contact with the blood of a patient with Hepatitis B antigen-positivity is 22-31%. It is 1-6% in the case of contact with the blood of a patient with Hepatitis B antigen-negativity and 0.4-1.8% in the case of contact with the blood of a patient with HCV positivity.¹⁷

However, the follow-ups of the participants did not result in Hepatitis B and C infection due to contact with patients infected with these viruses, indicating the success of the vaccination program in our country and the significance of immunization in primary prevention against infectious diseases. The Hepatitis B vaccine, included in the routine vaccination schedule in our country in 1998, is also among those recommended for healthcare professionals by the Advisory Committee on Immunization Practices.¹⁸

An Indian-based study reported that 44.6% of healthcare professionals having had an occupational accident due to a sharp object injury and splashes of patient secretions were physicians.¹⁹ In the same study, it was uttered that 7.7% of the source patients had Hepatitis B, 2.6% had HIV, and 1% had HCV-positivity and that more than 80% of healthcare workers preferred to have the Hepatitis B vaccine and immunoglobulin following the occupational accidents.¹⁹ Accordingly, healthcare professionals are likely to encounter significant risks, particularly infectious diseases (e.g., Hepatitis B, Hepatitis C, and HIV), and experience occupational accidents in the provision of healthcare services. Such occupational accidents are then likely to end in mortality, severe injury, or deterioration in the quality of life.^{20,21}

Viral hepatitis is included among occupational infectious diseases in the occupational diseases list of the Social Security Institution (SSI) in our country.²² It is evident that healthcare professionals often face such infectious diseases in their working settings. Yet, these diseases are entirely preventable. Education, immunization, elimination of risk at source, and regular use of PPE seem critical regarding protection from infectious diseases.

Despite not being efficient in preventing a sharp object injury, the use of gloves can reduce the amount of contamination. In our study, the majority of our participants (88.8%) reported having utilized PPE during the accident, among whom 97.4% used gloves. Thus, wearing gloves seems critical given that the hands are the most frequently injured area in occupational accidents in a healthcare setting and that contact with the hands poses a higher risk of contamination of various health problems. Although using PPE is key in preventing occupational accidents, it should be noted that the very first measure needs to eliminate the risk at the source.

CONCLUSION

It is known that physicians, nurses, and other healthcare professionals in primary, secondary, and tertiary healthcare institutions face various risks during working hours. Occupational accidents, characterized mainly by sharp object injuries, are often encountered among young, inexperienced healthcare professionals and in the group with lower educational attainment. Thus, healthcare professionals may need to be recruited for training at regular intervals to increase their knowledge about various risks to be encountered in the provision of health services. Awareness-raising instruments, such as posters and brochures, may also contribute to their awareness of such risks.

We discovered that the participants mostly had an accident due to a needle-stick injury in their hands. Yet, it is likely to minimize or even entirely prevent occupational accidents among healthcare professionals. Therefore, both their physical working environments and working hours can be rearranged, and relevant support should be offered to those in need of psychosocial assistance. Healthcare professionals should also be informed about the issues that one needs to close the needle cap following injection and properly throw used syringes and sharp medical objects into the medical waste box. In this regard, infection control committees may need to cooperate with clinic staff in hospitals. While providing the necessary occupational health and safety training to healthcare professionals, the principle of eliminating the risk entirely or, if not possible, minimizing it should be adopted according to the control hierarchy.

In addition to all the precautions to be taken, it is essential to convey the importance and the proper use of PPE to the staff to protect themselves from possible risks. Inspection of PPE to be used in relevant units and planning of training for their proper use need to be carried out in cooperation with the occupational health and safety unit and infection control committees.

ETHICAL DECLARATIONS

Ethics Committee Approval: The Ethics Committee of Keçiören Training and Research Hospital granted ethical approval to our study (Date: 02.23.2021, Decision No: 2012-KAEK-15/2219).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

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